

**Notice of Allowability**

Application No.

10/796,563

Examiner

Juan A. Torres

Applicant(s)

GIANNAKIS ET AL.

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment - After Non-Final Rejection filed on 09/11/2007.
2. ☒ The allowed claim(s) is/are 1-27.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 8/7/07 and 9/11/07
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 08/07/2007 and 09/11/2007 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Regarding reference number 21 (see argument section of the Amendment - After Non-Final Rejection filed on 09/11/2007) the Examiner agrees with the publication date of Q2 2001.

It seems that from <http://portal.acm.org/citation.cfm?id=621733&dl=GUIDE&coll=GUIDE> (see search notes and reference 7 of the link above) that the reference was available, at least on-line, on April 30, 2001, (7 J. Foerster, et al., "Ultra-Wideband Technology for Short- or Medium-Range Wireless Communications," <i>Intel Technology J., </i> Q2, 2001, [http://intel.com/technology/itj/q22001/articles/art\\_4.htm](http://intel.com/technology/itj/q22001/articles/art_4.htm) (current 30 Apr. 2001)).

### ***Drawings***

The modifications to the drawings were received on 09/11/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 09/11/2007, the Examiner withdraws drawings objections of the previous Office action.

### ***Specification***

The modifications to the specification were received on 09/11/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 09/11/2007, the Examiner withdraws specification objections of the previous Office action.

***Response to Arguments***

Applicant's arguments, see Amendment - After Non-Final Rejection, filed 09/11/2007, with respect to claims 1, 12, 20 and 24 have been fully considered and are persuasive. The rejections of claims 1, 12, 20 and 24 have been withdrawn.

***Allowable Subject Matter***

Claims 1-26 are allowed.

The following is an examiner's statement of reasons for allowance: Claims 1-26 are allowed because a comprehensive search of prior art failed to teach, either alone or in combination, processing a stream of information-bearing symbols to form a plurality of symbol blocks, wherein each symbol block comprises more than one of the information bearing symbols, generating multiple ultra-wideband (UWB) waveforms from the symbol blocks, wherein each of the UWB waveforms convey the symbols of their respective symbol blocks as pulses repeated over a plurality of frames, and transmitting the UWB waveforms over different antennas as a space-time coded UWB communication; processing a stream of information-bearing symbols to form a plurality of symbol blocks, wherein each symbol block comprises one or more of the information bearing symbols, generating multiple ultra-wideband (UWB) waveforms from the symbol blocks, wherein each of the UWB waveforms convey the symbols of their respective symbol blocks as pulses repeated over a plurality of frames, transmitting the UWB waveforms over different antennas as a space-time coded UWB communication,

wherein processing a stream of information-bearing symbols comprises duplicating each symbol to form a first symbol block and a second symbol block each comprising the same information bearing symbol, wherein generating multiple UWB waveforms comprises generating a first UWB waveform from the first symbol block and a second UWB waveform from the second symbol block, and wherein transmitting the UWB waveforms comprises simultaneously transmitting the first UWB waveform from a first transmit antenna and the second UWB waveform from a second transmit antenna; a wireless communication device comprising a space-time (ST) encoder that processes a stream of information-bearing symbols to form a plurality of ST-encoded symbol blocks, wherein each symbol block comprises more than one of the information bearing symbols, a plurality of pulse shapers that generate multiple ultra-wideband (UWB) waveforms from the symbol blocks, wherein each of the UWB waveforms convey the symbols of their respective symbol blocks as pulses repeated over a plurality of frames, and a plurality of antennas that transmit the UWB waveforms over a wireless communication channel; a wireless communication device comprising a space-time (ST) encoder that processes a stream of information-bearing symbols to form a plurality of ST-encoded symbol blocks, wherein each symbol block comprises one or more of the information bearing symbols, a plurality of pulse shapers that generate multiple ultra-wideband (UWB) waveforms from the symbol blocks, wherein each of the UWB waveforms convey the symbols of their respective symbol blocks as pulses repeated over a plurality of frames, a plurality of antennas that transmit the UWB waveforms over a wireless communication channel, wherein the ST encoder duplicates each symbol to

form a first symbol block and a second symbol block each comprising the same information bearing symbol, and the plurality of pulse generators generate a first UWB waveform from the first symbol block and a second UWB signal from the second symbol block for simultaneous transmission via the plurality of antennas; a wireless communication device comprising a plurality of antennas to receive a plurality of space-time (ST) encoded ultra wideband (UWB) waveforms through a wireless communication channel, each ST encoded UWB waveform having a plurality of information-bearing symbols within a symbol block that are conveyed as pulses repeated over a plurality of frames, and a maximum ratio combining (MRC) unit that processes the ST encoded UWB signals and produces a stream of estimate symbols; and an ultra-wideband communication system comprising a transmitter that outputs a plurality of space-time (ST) encoded ultra wideband (UWB) waveforms via a plurality transmit antennas, each ST encoded UWB waveform having a plurality of information-bearing symbols within a symbol block that are conveyed as pulses repeated over a plurality of frames, and a receiver that receives the plurality of ST-encoded UWB waveforms via a wireless communication channel, and performs maximum ratio combining (MRC) on the UWB signals to produce estimate symbols, as the applicant has claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is 571-272-3119. The examiner can normally be reached on 8-6 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Juan Alberto Torres  
09-19-2007

  
MOHAMMED GHAYOUR  
SUPERVISORY PATENT EXAMINER